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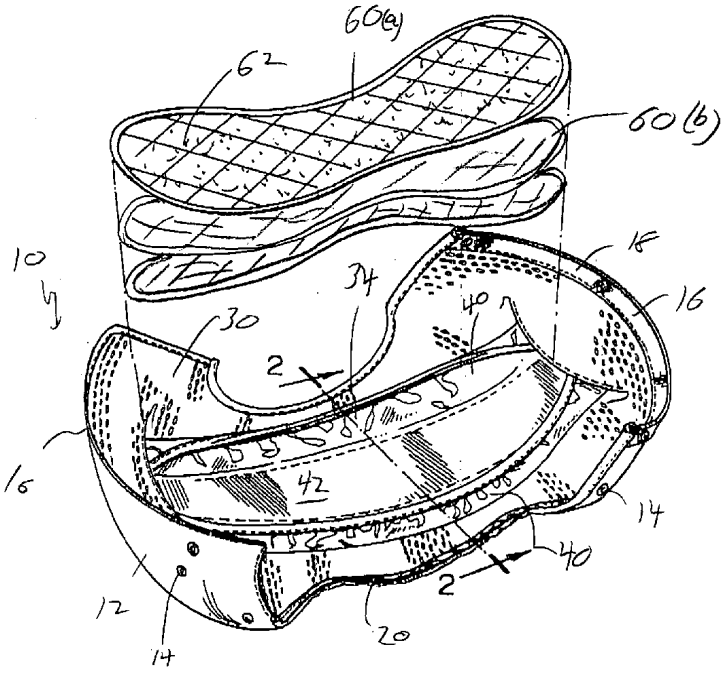
(54) **COUCHE LAVABLE REUTILISABLE**
(54) **REUSABLE WASHABLE DIAPER**



(57) A reusable washable diaper comprises an outer shell, one face of which is substantially covered by a free-floating highly porous and non-absorbent liner. An elongate waterproof retainer is fastened to the liner, and extends generally around the crotch of the user. The retainer features pockets on opposed edges for releasably retaining an absorbent pad. The free-floating liner permits washing fluid to freely circulate around the retainer during the laundering process, while enhancing comfort of the garment.

ABSTRACT

A reusable washable diaper comprises an outer shell, one face of which is substantially covered by a free-floating highly porous and non-absorbent liner. An elongate waterproof retainer is fastened to the liner, and extends generally around the crotch of the user. The retainer features pockets on opposed edges for releasably retaining an absorbent pad. The free-floating liner permits washing fluid to freely circulate around the retainer during the laundering process, while enhancing comfort of the garment.

REUSABLE WASHABLE DIAPER

FIELD OF THE INVENTION

The present invention relates to undergarments for incontinent persons, namely reusable washable diapers. Specifically, the invention relates to diapers of the type comprising an outer waterproof barrier shell and an absorbent pad within the interior of the diaper shell. The present invention is particularly directed towards adult diapers, but may be readily adapted for use with infant diapers.

BACKGROUND OF THE INVENTION

Reusable diapers, and in particular diapers intended for use by incontinent adults, conventionally include a waterproof barrier layer that forms a wearable brief or pant-type undergarment and an absorbent inner layer adjacent to the user. Desirably, reusable diapers are readily launderable within commercial or institutional laundries, for example in hospitals, nursing homes and the like. The institutional laundering process typically expose the diapers to relatively extreme tumbling, agitation, laundering chemicals and the like. In particular, the drying process exposes the garment to relatively high heat which can break down the diaper material. Further, the laundering process is relatively labor-intensive and any reduction in the labor input required in the laundering process is desirable.

It is desirable to provide several useful features within launderable diapers. First, the diaper must require minimum labor, time and energy when repeatedly laundered within a commercial or institutional laundering operation. The diaper design must also permit complete circulation of laundering liquid around the diaper components to ensure complete washing without entrapment of fluids within any part

of the diaper. The laundering must also occur with a minimum of entanglement of the diaper components. The diaper should be capable of withstanding repeated laundering, in particular drying, cycles before the material breaks down. Ideally, the diaper must also be capable of meeting a variety of user needs relative to fluid retention volume, sizing and the like. Finally, the diaper must minimize wicking and direct leakage which may occur in use, either around the edges of the diaper where the interior components of the diaper may contact the user's outer garments, or through disruptions of the integrity of the outer waterproof diaper shell, such as stitching openings or the like.

It is further desirable to provide a diaper wherein the thickness of the absorbent component may be varied to change the performance of the diaper in terms of the amount of fluids absorbed thereby. Accordingly, it is desirable to provide a means whereby different thickness or types of absorbent pads may be used within a single diaper, arrangement. However, the use of thick pads increases the laundering time. This aspect has been addressed within the present invention with the provision of multiple, relatively thin pads which when laundered separate into readily washable members.

Within the prior art, several of these aspects have been addressed by way of providing a reusable diaper comprising a form-fitting waterproof shell, forming a wearable garment such as a brief, with an absorbent pad retained within the interior of the garment. Conventionally, the absorbent layer consists simply of a folded cloth pad or the like which is simply placed within the interior of the garment. The cloth may be retained by Velcro (TM) or other fasteners or simply held by friction between the shell and the pad. A drawback of this traditional arrangements resides in the slippage of the cloth pad relative to the shell, which can result in the pad slipping out from the diaper or shifting within the shell to the point of diminished utility. Slippage of the pad can result in discomfort to the user, and as well in wicking of liquids between the pad and the interior of the shell to the user's outer garments. The slippage effect is particularly a problem within adult diapers, which have a significantly larger leg opening and

surface area relative to infant diapers, although slippage can be also be a problem within infant diapers.

One approach taken with the art has been to provide a stitched in place pad within the shell, which forms an absorbent interior layer. For example, U.S. Patent No. 5,137,526 (Coates), disclosed a diaper comprising a waterproof shell layer and an essentially free-floating absorbent pad stitched to the interior of the shell and forming a sling-like member which is stitched at either end to the shell. However, the free-floating sling design is not well suited for use with adult diapers. When extended to the length required within an adult diaper, the free-floating sling may have a tendency to slip out from underneath the shell during use, causing discomfort and lack of effectiveness to the user. Further, during washing, the sling may become entangled with other diapers. Further, the stitching at the ends of the sling to the barrier layer creates needle openings through the barrier shell permitting fluids to wick from the pad to the outside of the diaper. Further, since the absorbent layer cannot be separated from the shell, the user cannot vary the thickness of the absorbent pad to suit different needs. Further, diapers of this design can suffer breakdown during laundering. The waterproof outer shell is typically not well suited to withstand the relatively prolonged exposure to heat and tumbling experienced during the drying cycle of a commercial or institutional laundering process. Since the inner absorbent pad is fixed to the shell, the shell must be exposed to a lengthy drying process while the inner pad undergoes drying. As well, during the laundering process, fluids may remain entrapped within the tight space where the pad is stitched to the shell, since the pad cannot be removed during laundering.

Another approach, taken within US Patent No. 5,360,422 (Brownlee et al) and US 5,405,342 (Roessler et al), is to provide within a reusable diaper shell, a retainer for holding a removable pad. Typically, the retainer consists of an arrangement of pockets or flaps stitched into the interior of the shell, for releasably retaining an absorbent pad, which may be either disposable or washable. The retainer within this type of arrangement is stitched or fastened generally directly to the inside of the shell,

and this generally inhibits the free flow of washing liquid around the retainer. Further, the stitching generally results in needle holes or the like through the central region of the shell, thus permitting wicking through the shell.

A desirable labor-saving feature resides in the ability of the diaper to effect a release of the pad during the washing process, whereby a laundry operator is not required to manually separate the respective components prior to laundering.

Many of the drawbacks of the prior art diapers can be addressed by providing within a washable diaper a removable absorbent inner pad or pads retained within a suitable retainer that limits slippage of the inner pad while permitting easy removal of the pad and a free flow of liquid around the diaper components during laundering. The use of a removable inner absorbent pad within a diaper permits removal of the pad for the laundering process. The pad, which retains significantly more moisture than the waterproof shell, can thus be washed and dried separately. This will permit a reduction in the required drying time of the shell, reducing costs, time and energy input and extending the life of the shell. Accordingly, the use of a removable pad permits the outer and relatively more expensive component of the diaper to be laundered separately from the inner absorbent pad. A suitable approach to fastening the retainer to the shell permits washing liquid to flow freely around the retainer to fully wash all diaper components. The pads, whether single or multiple, need not incorporate a waterproof barrier layer, this function being provided bythe retainer. Laundering is thus further facilitated, in particular the improved removal of moisture from the pad during the spin cycle without blockage from a barrier layer.

A further drawback within the prior art diapers, which is addressed in the present invention, resides in the ability of the diaper to adequately retain a relatively significant volume of fluids, this being an important requirement particularly within adult incontinence diapers. A conventional diaper with an absorbent pad either simply placed within a diaper shell or retained therein in a sling-like arrangement, must comprise a relatively thick absorbent layer in order to achieve the necessary retention.

This can result in discomfort and undesired visibility of the diaper during use. Within the present invention, this aspect is addressed by providing a trough-like retainer member within the diaper shell to releasably retain an absorbent pad. This has the further advantage of reducing costs and laundering time and greater ease of handling and storage of the pads.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a reusable washable diaper having a removable absorbent pad retained by an outer barrier shell. It is a further object to provide a reusable diaper that is easily laundered without entanglement and in which the inner absorbent pad may be readily released by the action of a washing machine, thereby effecting an automatic separation of the diaper components during laundering. It is a further object to provide a reusable diaper characterized by a minimum of wicking of fluids from the interior of the diaper to the exterior. It is a further object to provide a reusable diaper characterized by a removable absorbent inner pad that may be readily removed or replaced, and which when retained within the diaper is maintained in the proper position with a minimum of shifting during use.

In light of the foregoing objects, the present invention comprises in one aspect; a washable reusable diaper comprising:

a shell having an exterior and an interior face, a waist and leg openings;

a substantially free-floating liner within the interior of the shell and substantially covering the inside face of the shell, fastened to the shell adjacent the periphery of the shell and liner;

an elongate waterproof retainer fastened to the liner, the retainer having opposed sides generally parallel to the leg openings and opposed ends transverse thereto. The retainer comprises a substantially waterproof sheet having an interior face facing said shell and an exterior face facing into the interior of the diaper. Elongate pockets on opposed edges of the retainer open towards the interior of the diaper for releasably retaining an absorbent pad within the interior of the diaper around the crotch

of a wearer. Body fluids are substantially retained within the interior of the retainer, and prevented from seepage through the shell. The free-floating liner interposed between the retainer and the shell and the waterproof retainer substantially prevents wicking or seepage from occurring through to the exterior of the shell.

The term "waterproof" means substantially liquid impervious.

A removable absorbent pad is releasably retained within the retainer. The pad is conveniently hourglass-shaped and may comprise an inner absorbent layer and an outer highly porous non-absorbent layer. The hourglass configuration improves the fit of the assembled garment and further enhances the retention of the pad within the retainer and the liquid retention properties of the pad. These latter two functions result from the increased effective depth of the side pockets resulting from the concave sides of the pad. Preferably, multiple relatively thin absorbent pads are provided.

The retainer pockets conveniently comprise folded over portions of the sides of the retainer, and/or folded over end portions of the retainer. The side retainer pockets preferably each have an elasticized free edge. Alternatively, the pockets may comprise separate elements on either side of the retainer, with a web extending therebetween forming a retainer body.

The exterior of the retainer preferably comprises a relatively smooth non-wicking layer and the interior comprises a relatively non-slip surface.

The retainer is preferably fastened to the liner both at and between the ends of the retainer, and preferably also substantially around the perimeter of said retainer, so as to form a substantially monolithic structure whereby the retainer is in juxtaposition with the liner.

The retainer is conveniently essentially rectangular but formed from a boat-shaped fabric blank.

The liner is preferably formed from a substantially non-absorbent perforated or highly porous fabric. The free-floating liner permits washing liquid to circulate freely through the garment on all sides of the retainer. Further, user comfort is increased through the use of a soft, non-absorbent "stay dry" type liner fabric.

The shell is preferably formed from a single fabric blank having opposed ends, the ends forming when joined together a waist. The shell includes fastening means to join together the waist. Preferably, the fastening means comprises multiple rows of snaps or other fasteners to permit size adjustment to accommodate users with different size waists.

Having thus characterized the invention in general terms, the invention will now be further described by way of a detailed description of a preferred embodiment of the invention, with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a diaper according to the present invention in an open, unfolded position, with a diaper pad portion;

Figure 2 is a sectional view of the diaper, along line 2-2 of figure 1;

Figure 3 is a plan view of the inside of the diaper in an open position;

Figure 4 is a perspective view of the diaper, in the assembled, use position; and

Figure 5 is a plan view of an alternative embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to figures 1 to 4, the diaper 10 according to the present invention comprises an exterior shell 12, which when in the closed position (shown in figure 4) forms a "brief" type wearable garment. The shell may be formed from a waterproof and durable fabric such as coated knit polyester or other synthetic fabric which may be

laminated with a waterproof or waterproof/breathable layer such as polyurethane. Alternatively, the shell may be formed from a non-waterproof, breathable fabric. The garment is formed from a single piece of material, and includes fastening means 14 which hold the front and rear of the garment together at the waist. In the unfastened, open position the garment forms a generally hourglass shaped piece. A portion of the waistband 16 of the garment is elasticized, by means of an elastic layer 18 stitched into one end of the unfolded hourglass shaped piece, which when assembled into a garment provides an elasticized band around half the waistband of the garment. An array of snaps 14 or other fastening means adjacent the respective ends of the unfolded garment, on either side thereof, fasten the garment together to form the brief. Multiple rows of either or both the male or female snap parts provide adjustability of the garment waist size. Opposed elasticized portions 20 on each side of the garment in the middle region thereof (in the unfolded position) form a pair of elasticized leg openings when the garment is fastened into the wearable configuration.

Turning to the open configuration shown in figures 1 and following, the respective ends of the garment will be described as "upper" and "lower". It will be understood that when the garment is folded into the brief configuration shown in figure 5, the upper end 22 comprises either the front or rear of the garment and the lower end 24 comprises the opposing side. The terms "inner" and "outer" used herein refer to the inside and outside of the garment, respectively, when it is assembled into the wearable configuration.

A free-floating liner 30 is fastened to the inner face of the shell, and substantially covers the inner face. The liner is stitched to the shell around the perimeter of the shell and liner. Since the liner is fastened to the shell only at the respective perimeters of the two layers, the liner is unattached and is separable from the shell except at the periphery of the shell and liner. The liner comprises a highly porous, generally non-absorbent material such as a fabric mesh, which permits a relatively free flow of liquid there through. Preferably, the liner fabric is a soft "stay-dry" type material to improve user comfort. An inner face of the liner faces the shell and an outer face faces into the

interior of the diaper. The fabric may comprise a relatively open-weave or perforated polyester fabric. Ideally as well, the liner fabric should be relatively comfortable to the touch, comprising as it does the contact surface of the skin of the user. The high porosity of the liner permits washing fluid to freely circulate behind the liner during the washing process.

An elongate retainer 34 is stitched or otherwise fastened to the outer face of the liner, facing into the interior of the diaper. The retainer is generally trough-shaped and is preferably formed from a single of piece of waterproof fabric. The retainer comprises ends 36 and elongate sides 38, the ends being disposed parallel to the waistband of the garment and the sides parallel to and inboard of the leg openings. The retainer extends generally around and covers the crotch of the user when the garment is worn. The interior of the retainer faces towards the interior of the garment and the exterior thereof faces the inner face of the shell. The sides of the retainer are folded over so as to form a pair of elongate side pockets 40 extending substantially the full length of the retainer on either side thereof. The side pockets face the interior of the garment and extend laterally part way across the face of the retainer, leaving a substantial central web 42 of the retainer between the pockets. The pockets thus resemble a pair of spaced apart lips extending along the sides of the central web 42. The respective ends of the retainer are similarly folded over to form relatively shallow end pockets 44, also facing into the interior of the garment. The end and side pockets are both formed by lines of stitching 46 across the respective ends of the retainer. The retainer is stitched in place to the liner generally around the perimeter of the retainer, although it is not essential that the stitching extend fully around the perimeter of the retainer. As discussed in detail below, other stitching or fastening means may connect the retainer to the liner within other versions of invention. However, it is important that the retainer be fastened solely to the liner rather than directly to the shell, so as to permit the free flow of washing fluid between the retainer and the shell while eliminating needle holes within the central part of the shell and still permitting a fastening of the central portion of the retainer.

The fabric of the retainer comprises a smooth exterior face 50, facing the mesh liner, and a slip resistant interior surface 52. Further, the retainer is formed from a generally waterproof material to retain liquid within the interior thereof. The non-smooth surface provides a measure of friction, to retain the removable liner (described below) in position within the interior of the retainer.

The retainer is generally rectangular in plan. However, it is formed from a boat-shaped fabric blank, the sides of which bow outwardly away from each other. Since the fold lines 54 which form the outer edges of the side pockets are generally straight, the boat-shaped configuration of the blank forms the pockets which are deeper at the middle region of the retainer. This permits the pockets to accommodate relatively thick or multiple absorbent insert pads. The exposed edges of the pockets are elasticized, thus establishing an arcuate shape of the retainer from end to end to conform to the user.

Multiple absorbent pads 60(a) - 60(c) are releasably retained within the side and end pockets of the retainer. The pads have substantially identical configurations. Turning to figure 3, each absorbent pad 60 for use with the diaper ideally has a generally hourglass shaped figure, although a straight-sided pad or other configuration may be accommodated. The pads are fabricated from an absorbent, comfortable material such as cotton. One side of the uppermost pad 60(a) may have a "stay dry" layer 62, such as non-absorbent, porous and wicking fabric such as polyester fabric, for contact with the user skin to increase the comfort of the pad. The thickness and/or number of pads may be varied to reflect different user requirements. The pads may be made of a washable absorbent layer or a disposable material.

The pads 60 are removably retained within the pockets 40 and 44. The configuration and depth of the pockets are shaped to achieve a secure retention of the pads during use, while permitting release of the pads from the retainer during the washing cycle, by the agitation of the washing process. The pads may alternatively be removed prior to the laundering process. Effective laundering of the diaper may be

achieved by way of separation of the pad from the shell, which in combination with the the free-floating liner permits washing fluid to generally freely circulate around the retainer.

Desirably, the retainer is of a uniform length, regardless of the size of the diaper, to permit a standard size absorbent pad to be provided, regardless of the diaper size.

The retainer 34 may be fastened to the liner 30 in a variety of configurations. For example, the respective sides of the retainer need not be stitched along the full length of thereof to the mesh liner, and it is possible as well to provide but a single line of stitching 61 fastening the pocket to the liner as seen in figure 5. Any convenient fastening means may be provided to suitably fix the pocket to the shell and liner whereby displacement of the pocket relative to the shell is minimized.

Figure 5 also shows an arrangement whereby the retainer comprises side pockets each formed from a separate fabric piece 70 with a web 72 extending therebetween forming a retainer body.

As will be seen from the above described embodiment, the shape and configuration of the waterproof retainer, being secured to the liner, thus permits the liner to be freely separable from the shell so as to permit laundering of all of the components of the diaper. In prior art proposals, due to the configuration of the retainer, where the retainer by itself was free-floating, laundering was sometimes difficult and complete cleaning of the diaper was not always possible.

Care must be taken within the manufacturing process of the garment to minimize stitching openings through the shell or other breaches of the integrity of the shell at any position other than at the perimeter thereof to prevent wicking of moisture through the shell.

Although the present invention has been described by way of preferred embodiments thereof, it will seen by those skilled to the art that numerous departures from and variations to the preferred embodiments may be made without departing from the spirit and scope of the present invention, as the present invention is defined in the claims within the present specification.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A washable reusable diaper comprising:

a shell having an exterior and an interior face, a waistband and opposed leg openings;

a substantially free-floating liner substantially covering the interior face of said shell, fastened to the shell substantially at the periphery of said shell and said liner; and

an elongate waterproof retainer fastened to said liner, said retainer having opposed sides generally parallel to said leg openings and opposed ends transverse thereto, said retainer comprising a substantially waterproof sheet having an interior face facing said liner and said shell and an exterior face facing into the interior of said diaper, and having pockets on opposed edges of said retainer and opening towards the interior of the diaper for releasably retaining an absorbent pad within the interior of said diaper around the crotch of a wearer.

2. A diaper as defined in claim 1, wherein said retainer pockets comprise folded over portions of said sides of said retainer.

3. A diaper as defined in claim 1, wherein said retainer pockets comprise folded over portions of said ends of said retainer.

4. A diaper as defined in claim 2 wherein said retainer pockets each have an elasticized free edge.

5. A diaper as defined in claim 1, wherein said interior face of said retainer comprises a relatively non-slip surface.

6. A diaper as claimed in claim 1, wherein said retainer is generally rectangular and is formed from an essentially boat-shaped fabric blank.

7. A diaper as claimed in claim 1, wherein said liner is formed from a substantially non-absorbent perforated or highly porous fabric.

8. A diaper as defined in claim 1, wherein said retainer is fastened to said liner at the ends of said retainer.

9. A diaper as claimed in claim 8, wherein said retainer is further fastened to said liner between the ends of said retainer.

10. A diaper as claimed in claim 8, wherein said retainer is further fastened to said liner substantially around the perimeter of said retainer.

11. A diaper as claimed in claim 1 further comprising an absorbent pad releasably retained within said retainer.

12. A diaper as recited in claim 11, wherein said absorbent pad comprises substantially an hourglass configuration.

13. A diaper as recited in claim 11, comprising multiple absorbent pads having substantially identical configurations.

14. A diaper as claimed in claim 1 wherein said shell is formed from a single fabric blank having opposed ends, said ends forming when joined together a waist, said shell having fastening means to join together the waist thereof.

15. A diaper as recited in claim 14, wherein said fastening means comprise an array of snaps.

16. A diaper as defined in claim 11, wherein said absorbent pad comprises an inner absorbent layer and an outer non-absorbent porous layer.

17. A diaper as defined in claim 1, wherein said shell is formed from a waterproof fabric.

18. A diaper as defined in claim 11 wherein said pockets and said pads are configured to permit secure retention of said pad within said retainer during use, while said pad releases from said retainer within the wash cycle of a laundering operation.

19. A diaper as defined in any of the preceding claims, wherein said waterproof retainer has a shape and configuration so as to permit said liner to readily separate from said shell during laundering of said diaper.

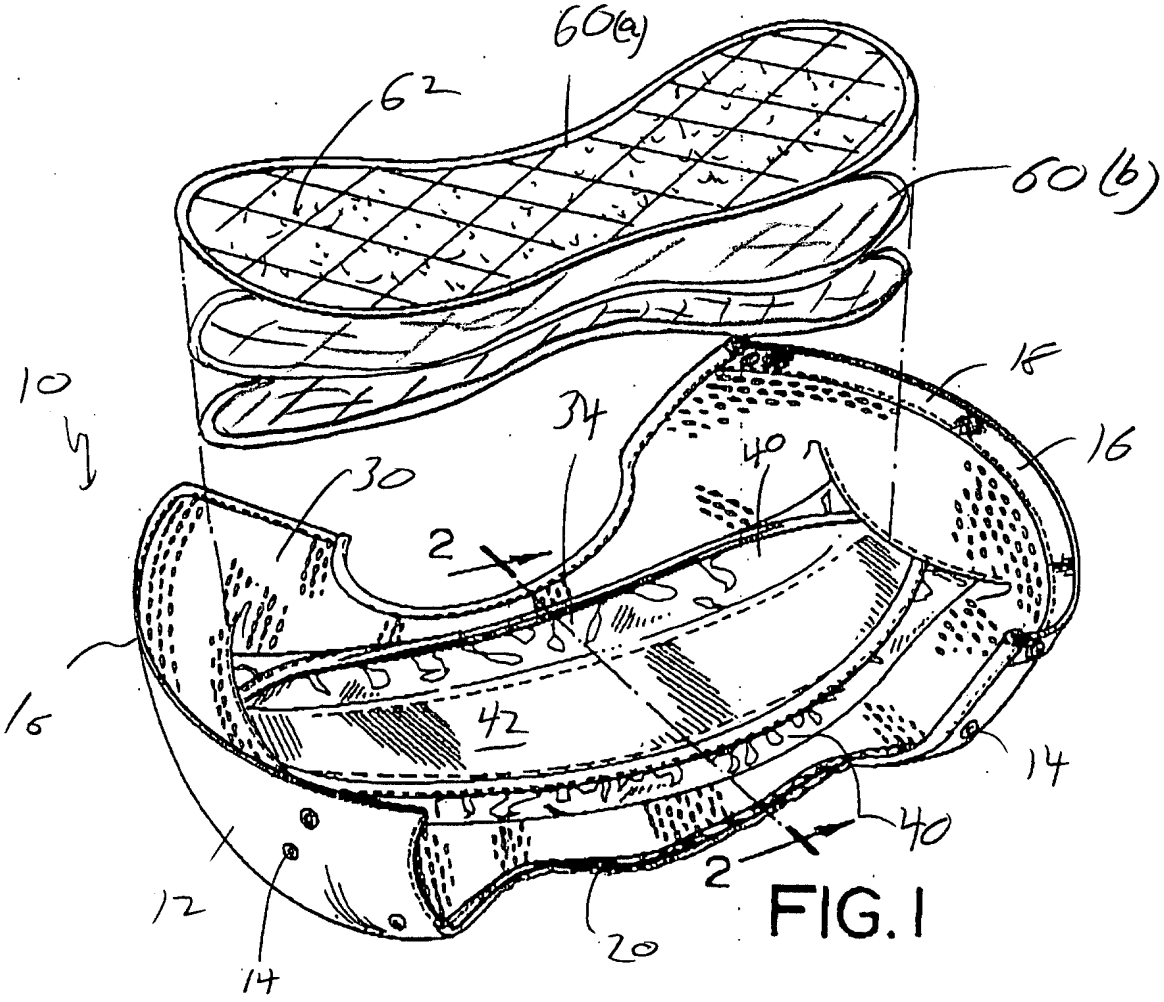


FIG.1

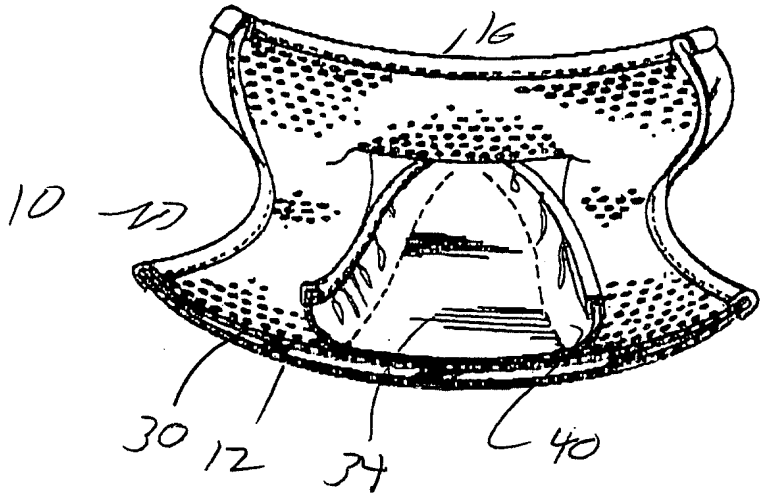


FIG.2

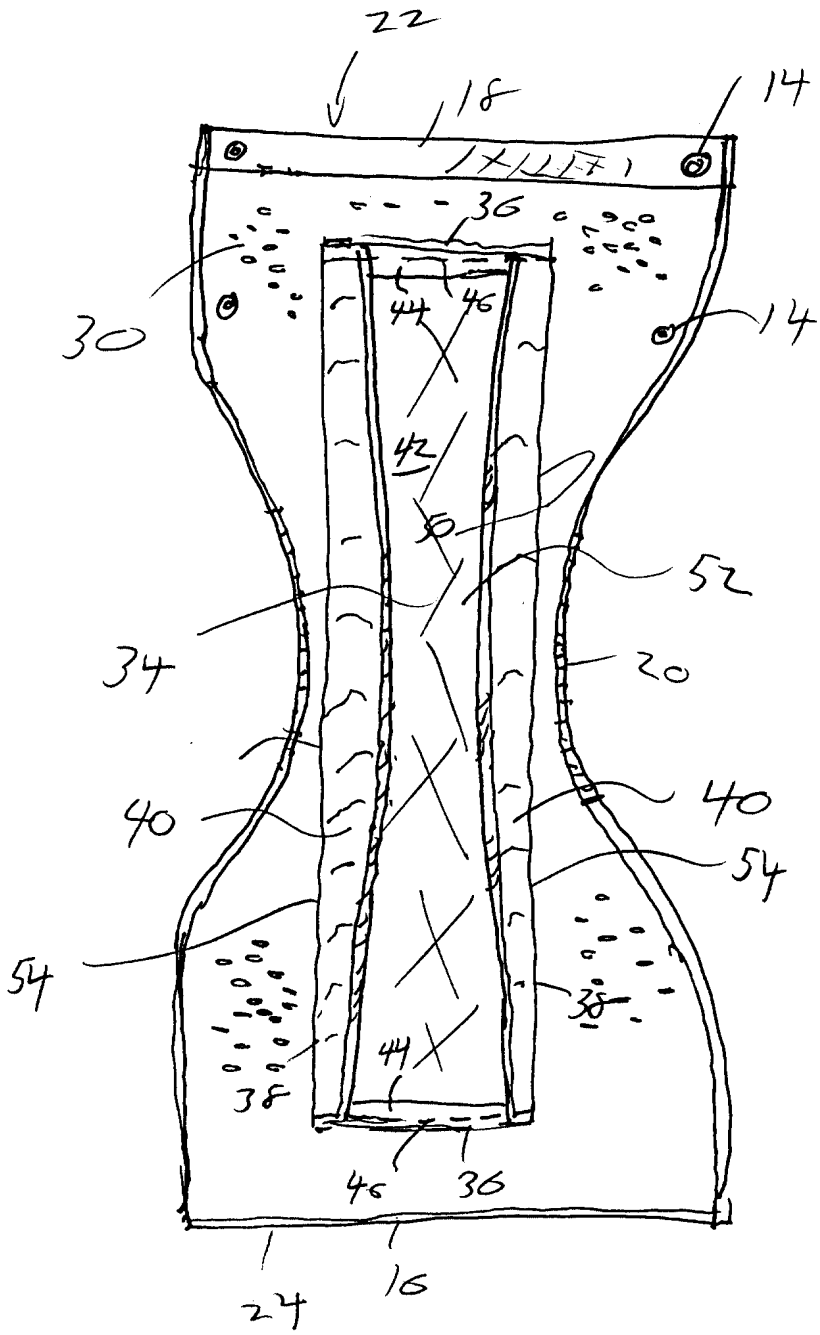


Fig. 3

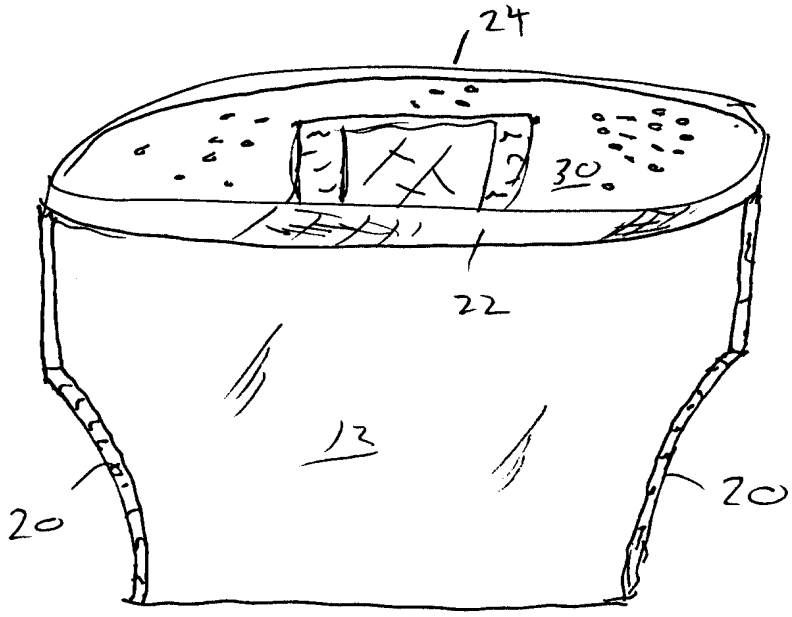


Fig. 4

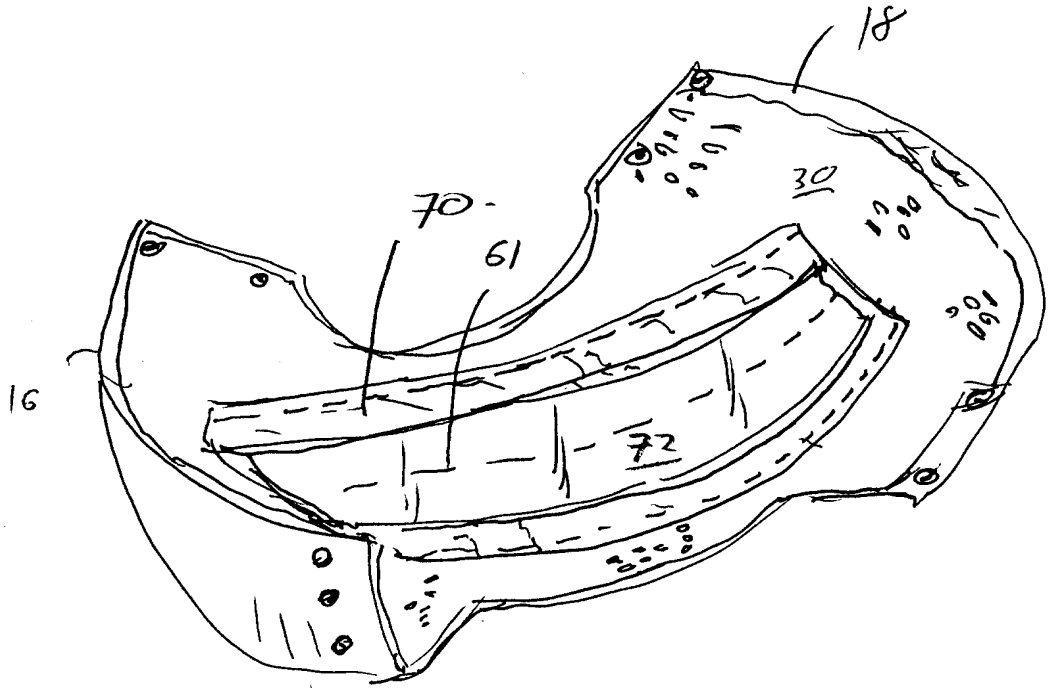


Fig. 5

DERWENT-ACC-NO: 2000-544083

DERWENT-WEEK: 200050

TITLE: A washable diaper has a free-floating liner attached to its periphery with a waterproof retainer sheet having pockets for receiving an absorbent pad.

INVENTOR: PRAGER I; READ E ; SCHREINER D

PATENT-ASSIGNEE: MED-I-PANT INC[MEDIN]

PRIORITY-DATA: 1998CA-2255465 (December 4, 1998)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE
CA 2255465 A1	June 4, 2000	EN

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
CA 2255465A1	N/A	1998CA-2255465	December 4, 1998

INT-CL-CURRENT:

TYPE	IPC DATE
CIPS	A61F13/15 20060101

ABSTRACTED-PUB-NO: CA 2255465 A1

BASIC-ABSTRACT:

NOVELTY - A washable re-usable diaper has free-floating liner (30) attached to the shell periphery and an elongate waterproof retainer sheet (34) attached to the liner and having pockets (40) on opposed edges for removably receiving an absorbent pad (60).

USE - In diaper manufacture.

ADVANTAGE - Is more comfortable in wear and more easily washed.

DESCRIPTION OF DRAWING(S) - The drawing shows a view of the diaper

Liner (30)

Retainer (34)

Pad (60)

Pockets (40)

CHOSEN-DRAWING: Dwg.1/5

TITLE-TERMS: WASHING DIAPER FREE FLOAT LINING ATTACH PERIPHERAL WATERPROOF RETAIN SHEET POCKET RECEIVE ABSORB PAD

DERWENT-CLASS: D22 F07 P32

CPI-CODES: D09-C03; D09-C04; D09-C06; F04-C01;

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: 2000-161988

Non-CPI Secondary Accession Numbers: 2000-402474